

Abstract of the Disclosure

A process is provided which can effectively inhibit occurrence of hot spots in reaction zones or heat accumulation at the hot spots, in the occasion of producing acrolein and acrylic acid through vapor phase oxidation of propylene in the presence of a catalyst using a fixed bed shell-and-tube reactor, said catalyst having a composition represented by a general formula (1):



(wherein A is at least an element selected from Co and Ni; B is at least an element selected from P, Te, As, B, Sb, Sn, Ce, Nb, Pb, Cr, Mn and Zn; C is alkali metal element; D is alkaline earth metal element; E is at least an element selected from Si, Al, Ti and Zr; and O is oxygen; a, b, c, d, e, f, g, h, i and x denote the atomic numbers of Mo, W, Bi, Fe, A, B, C, D, E and O, respectively, and where a is 12, b is 0-5, c is 0.1-10, d is 0.1-10, e is 1-20, f is 0-5, g is 0.001-3, h is 0-3, i is 0-30, and x is a numerical value which is determined depending on the extent of oxidation of each of the elements).

Said process is characterized by preparing plural kinds of catalysts having the above composition but differing from each other in (α) occupying volume, (β) calcining temperature and/or (γ) kind and/or amount of alkali metal element, and filling the reaction zones provided by dividing the catalyst layer in each of the reaction tubes in the reactor into at least two layers in the axial direction of the tube, sequentially with said plural kinds of catalysts in such a manner that the catalytic activity increases from the starting gas inlet side toward the outlet side.